Are graduates well-equipped for the labour market?

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Abstract

This paper attempts to develop insights into comparative evaluations of quality determinants for education services provided by higher education (HE) institutions as they are perceived by their graduates in some European countries. Quality in HE, as well as defining a way to measure it, is not a simple issue and there is no commonly accepted definition. Therefore, we based on student's opinions of their academic courses. Customer satisfaction generally is a function of the consumer's satisfaction with the different components comprising the service being provided. Understanding the complexity of the learning experience requires more than knowing the level of satisfaction of the students; it also demands an appreciation of the factors that contribute to student satisfaction. Measuring student satisfaction would help HE institutions to identify both their strengths and the areas that require improvement. For that purpose, we use the REFLEX (Flexible Professional in the Knowledge Society) data set, which allow the comparison among 14 European countries. We start with a brief description of some key characteristics of their study programme, modes of teaching and learning and the study behaviour and motivations reported by graduates. Our preliminary results suggest that demonstrating a relation between programme characteristics and modes of teaching on the one hand, and the level of competencies on the other hand does not necessarily mean that HE provides a sufficient basis to enter the labour market, nor does it necessarily indicate a sufficient basis for the later career.

Keywords: Higher Education; Programme Characteristics; Modes of teaching and learning; Usefulness of study at work

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1. Introduction

Although there is an ample literature on the concept of customer satisfaction, satisfaction of students with their higher education (HE) courses has been motivated, among others, by theories predicting a close relationship between students' satisfaction and learning outcomes (Richardson, 2005; Denson et al., 2010). HE institutions consider student satisfaction as one of the major elements in determining the quality of study program, which provide valuable information on the areas that matter students and help institutions gain a better understanding of their strengths and challenges in provision of the study program, and course designers, educators, and administrators can identify areas where improvement is needed (Eom & Wen, 2006; Havice et al., 2010).

Other theories, particularly in the psychological area, show that individuals face many decisions throughout their life (education, career, romance, parenting, etc.) and these choices are taken under a non-negligible amount of uncertainty. This prior uncertainty may lead all too often to undesired outcomes and, consequently, to the experience of regret (Roese & Summerville, 2005). Analyzing the experience of regretting in the area of education, retrospective regretting university studies has appeared as a recent European educational failure (Kucel & Vilalta-Bufí, 2013). Empirical literature has mostly focused on the link between study program and the first labor market experiences, which may have an effect on education regret (Robst, 2007). Education-labor mismatch is an important determinant of the likelihood of program regret. When individuals cannot find a job adequate to their studies, they are more likely to regret their field of study (Borghans & Golsteyn, 2007; Mora, 2010). Regarding gender and other ascribed characteristics, Chevalier (2002) found that female graduates regretted less their course choice than males, even if they earned lower salaries.

Against this conceptual background, our approach is to extend the previous analyses in several ways. First of all, we perform a comparative study in fourteen European countries, which allow us to investigate very distinct HE systems. Moreover, we introduce how educational variables and labor mismatch affect overall graduates' satisfaction of their study program, controlling for basic individual characteristics. Determining which factors cause and which increase the satisfaction of the study program may provide information about what actions can be taken to maintain high levels of study satisfaction, improve student learning and successful career.

The paper is organized as follows. Section 2 provides a descriptive analysis of the data. The methodological approach is presented in Section 3. The empirical results are discussed in Section 4 and Section 5 concludes.

2. Descriptive Analysis

The REFLEX (Flexible Professional in the Knowledge Society) survey is the source of the data for the present study (Allen and Van der Velden, 2011). Graduates in the year 2000 were

surveyed in 2005, five years after graduation. We have information on some 2,600 graduates from each of 14 European countries (Italy, Spain, France, Austria, Germany, the Netherlands, United Kingdom, Finland, Norway, Czech Republic, Switzerland, Portugal, Belgium and Estonia), obtained from the responses to a written questionnaire on graduates' retrospective views of their HE experience.

Some questionnaire items, in particular six characteristics, are related to description of the study programme. Respondents were asked to indicate the extent to these characteristic applied to the study programme they had followed on a 1 to 5 scale (1 not at all, 5 very much). Table 1 presents the average ratings for these items by country and gender.

The results show that, on average, the highest scores were assigned to the demanding of the programme (rated 3.60) and whether it had a broad focus (rated 3.57). Freedom in design a personal programme was rated low by graduates. Regarding gender differences, it is clear that in general the differences are quite weak, except for the degree of academic prestige of the study program rated 3.19 for male graduates and 2.95 for female graduates.

In relation to country differences, Finland, Norway, the Netherlands, Czech Republic and Portugal stressed practical learning/experience items, such as vocational orientation of the study programme, compared to graduates from Italy, Spain, France, Austria, Belgium, Germany, Switzerland, the United Kingdom and Estonia who rated this item low. The item on freedom to combine different courses and choose among areas of specialization was rated high by Finland, Germany and Italy, with Portugal, Czech Republic and France giving a low score for this. Italian graduates evaluated their study programme as demanding and academically prestigious in contrast to Dutch graduates, whose study programmes were regarded as less academically prestigious and less demanding.

Table 1. Description applied to the study programme by country and gender
(scale from 1=not at all to 5=very much)

The program was: →	Regarded as Demanding	Employers are Familiar	Freedom in Composing	Broad Focus	Vocationally Oriented	Academically Prestigious
Italy	3.98	2.76	2.97	3.58	2.73	3.46
Male	4.03	2.82	2.93	3.57	2.77	3.54
Female	3.94	2.72	2.99	3.59	2.70	3.39
Spain	3.67	3.19	2.91	3.55	2.70	3.00
Male	3.72	3.14	2.88	3.58	2.71	3.27
Female	3.65	3.22	2.92	3.53	2.69	2.85
France	3.53	2.66	2.39	3.00	2.34	2.56
Male	3.55	2.67	2.41	2.90	2.48	2.70
Female	3.52	2.65	2.38	3.01	2.27	2.49
Austria	3.77	3.00	2.93	3.77	2.68	3.14
Male	3.93	3.22	2.92	3.88	2.99	3.29
Female	3.65	2.83	2.94	3.68	2.42	3.01
Germany	3.71	2.99	3.02	3.66	2.77	3.01
Male	3.90	3.18	2.91	3.78	2.98	3.12
Female	3.53	2.81	3.12	3.54	2.56	2.89
The Netherlands	3.03	3.11	2.86	3.72	3.46	2.55
Male	3.21	3.24	2.95	3.81	3.43	2.72
Female	2.92	3.03	2.81	3.67	3.48	2.45
United Kingdom	3.66	2.80	2.47	3.63	2.56	3.35
Male	3.70	2.88	2.47	3.66	2.59	3.36

	Female	3.64		2.74		2.48		3.61		2.53		3.35	
Finland			3.50		3.14		3.14		3.72		3.57		3.08
	Male	3.56		3.36		3.33		3.69		3.58		3.22	
	Female	3.46		3.03		3.04		3.73		3.56		3.00	
Norway			3.65		3.80		2.48		3.57		3.65		2.90
	Male	3.79		3.73		2.78		3.52		3.40		3.16	
	Female	3.56		3.84		2.29		3.60		3.80		2.74	
Czech Republic			3.56		3.23		2.37		3.50		3.48		2.91
	Male	3.65		3.25		2.57		3.54		3.43		2.96	
	Female	3.50		3.21		2.23		3.47		3.51		2.86	
Switzerland			3.78		3.08		2.58		3.57		2.83		3.43
	Male	3.84		3.19		2.55		3.62		2.99		3.42	
	Female	3.69		2.92		2.62		3.49		2.58		3.23	
Portugal			3.77		3.01		2.13		3.36		3.29		3.58
	Male	3.70		3.06		2.08		3.30		3.25		3.59	
	Female	3.83		2.98		2.16		3.40		3.31		3.57	
Belgium			3.60		3.11		2.74		3.72		2.83		3.41
	Male	3.72		3.32		2.69		3.79		2.97		3.53	
	Female	3.51		2.95		2.78		3.66		2.72		3.32	
Estonia			3.19		2.71		2.66		3.55		2.46		3.23
	Male	3.26		2.83		2.80		3.64		2.44		3.24	
	Female	3.17		2.65		2.60		3.51		2.47		3.22	
TOTAL			3.60		3.09		2.69		3.57		3.04		3.05
	Male	3.71		3.17		2.74		3.61		3.08		3.19	
	Female	3.52		3.04		2.65		3.53		3.02		2.95	

Source: Own elaboration, REFLEX data.

Another eleven items in the questionnaire were related to modes of teaching and learning emphasized in the study programme. Respondents were asked to rank the extent to which particular modes of teaching and learning were stressed in their HE, on a 1 to 5 scale (1 not at all and 5 very much). Table 2 presents the average ratings for these items by country and gender.

In general, items related to teaching, such as regular attendance at lectures, emphasis on theories and paradigms and on facts and practical knowledge, teacher being the main source of information and the items related to learning in group as opposed to individual learning were rated quite high. Development of socio-communicative skills through written assignments and students' oral presentations in classes were emphasised higher than the assessment form of multiple choice exams. On contrary, programmes that offer experience in the form of participation in research projects, problem-based learning and internships and work placements were rated low. Regarding gender differences, on average, slight differences are found in the modes of teaching and learning emphasized by female and male graduates.

In relation to countries differences, there seems to be a negative relationship between the extent to which the teacher is regarded as the main source of information and a more project and problem-based learning. For differences in course content, there seems to be a negative relationship between emphasis on theories and paradigms, and emphasis on facts and practical knowledge.

What students learn is determined not only by the curriculum and the mode of teaching, but also by the method of assessment. Multiple-choice question exams as opposed to examinations based on written assignments, promote different ways of learning. Although in all the countries

analysed there was a stronger emphasis on written assignments than multiple choice question exams, there would seem to be a trade-off between these forms. Written assignments dominate in the United Kingdom whereas in Spain, the Netherlands and the Czech Republic although written assignments are still the majority, a large proportion of the exams are multiple choice.
Based on some characteristics of HE study programme and the modes of teaching and learning that were applied, we would expect to find differences in graduates' assessment of their study programme.

Our next step is to examine how these evaluations are related to characteristics of the study programme and the modes of teaching and learning, and if there are other individual and labour market characteristics which influence university graduates' evaluation of their study programme.

3. Methodology

The REFLEX survey asked respondents to what extent their study programme have been a good basis for: (i) starting work?; (ii) further learning on the job?; (iii) performing your current work tasks?; (iv) future career?; (v) your personal development?; and (vi) development of entrepreneurial skills?, in scale from 1 (not at all) to 5 (to a very high extent). To clarify if HE provides a good basis to enter to the labour market, we use as dependent variable graduates' evaluation of the study programme (graduates' self-assessment scores on a scale from 1 to 5), so to reflect its ordinal character we implement ordered probit models. Maximum-likelihood estimation of the model is carried out using the Newton-Raphson algorithm based on second derivatives (Green, 1997).

We select from the REFLEX data set only individuals between 26 and 35 years of age that worked at least 10 hours per week either as employees or as self-employed workers. After deleting those cases with missing values on graduates' self-assessment scores, we were left with 19,084 micro data files that were used for our analysis. For carrying out our analysis, data from each country was weighted by the proportion of HE students and the population of each country.

The explanatory variables are classified into three main categories representing diverse elements that could influence graduates' self-assessed HE study programme scores: individual-specific characteristics, labour-market status variables, and educational and academic environment factors. Descriptive statistics for all the variables are reported in the Appendix (see Table A1). For a more detailed analysis, we use dummies for each European country included in the sample: Italy, Spain, France, Austria, Germany, the Netherlands, United Kingdom, Finland, Norway, Czech Republic, Switzerland, Portugal, Belgium and Estonia.

Table 2. Modes of teaching and learning emphasized in the study programme by country *(scale from 1=not at all to 5=very much)*

Items	Lecture attendance	Group assignments	Independent learning	Work placements	Practical knowledge	Theories and paradigms	Teacher as main source	Problem-based learning	Written assignments	Oral presentation	Multiple choice exams
Italy	3.93	2.45	2.25	2.01	2.42	3.14	3.76	2.50	3.07	3.45	1.98
Male	3.85	2.50	2.20	1.96	2.34	3.23	3.75	2.62	3.19	3.39	1.99
Female	3.99	2.41	2.29	2.05	2.47	3.09	3.77	2.42	2.98	3.50	1.98
Spain	2.96	2.92	1.87	2.36	2.95	3.83	3.76	2.66	3.06	2.37	2.85
Male	2.73	2.67	1.83	2.12	2.83	3.82	3.75	2.75	2.83	2.12	2.68
Female	3.08	3.06	1.90	2.50	3.02	3.84	3.76	2.61	3.19	2.51	2.94
France	4.08	3.23	2.24	2.73	3.18	3.05	3.52	2.37	3.50	3.03	1.58
Male	4.00	3.22	2.32	2.90	3.37	3.04	3.46	2.54	3.36	3.03	1.58
Female	4.11	3.24	2.19	2.64	3.08	3.06	3.55	2.29	3.57	3.03	1.58
Austria	3.88	3.11	1.92	2.70	3.07	3.68	3.51	2.81	3.77	3.26	1.96
Male	3.78	3.19	2.06	2.80	3.15	3.60	3.43	2.99	3.64	3.23	1.92
Female	3.97	3.04	1.80	2.62	3.01	3.75	3.58	2.65	3.89	3.30	2.01
Germany	4.03	2.96	1.92	3.30	3.15	3.43	3.34	2.77	3.58	3.15	1.86
Male	4.06	2.98	1.97	3.32	3.26	3.37	3.34	2.87	3.55	3.01	1.89
Female	4.01	2.94	1.87	3.27	3.05	3.48	3.33	2.66	3.61	3.29	1.82
The Netherlands	3.54	3.74	2.58	3.59	3.46	3.20	3.13	2.92	3.08	3.27	2.95
Male	3.59	3.66	2.57	3.49	3.39	3.19	3.10	2.98	2.90	3.18	2.90
Female	3.51	3.79	2.59	3.66	3.50	3.21	3.15	2.88	3.19	3.33	2.98
United Kingdom	4.37	2.98	2.61	2.08	3.37	3.45	3.21	3.09	4.17	3.17	1.70
Male	4.34	3.03	2.52	2.06	3.31	3.48	3.16	3.23	3.98	3.00	1.73
Female	4.38	2.94	2.67	2.09	3.42	3.44	3.24	3.00	4.30	3.28	1.69
Finland	3.72	3.43	2.27	3.18	3.38	3.52	3.16	3.02	3.76	3.04	1.60
Male	3.57	3.28	2.28	2.98	3.37	3.49	3.06	3.07	3.60	2.85	1.66
Female	3.81	3.51	2.26	3.29	3.39	3.54	3.21	2.98	3.86	3.14	1.57
Norway	4.24	3.29	1.86	2.69	3.17	3.44	2.95	3.02	3.58	2.58	1.31
Male	4.18	3.19	1.93	2.20	2.97	3.46	2.94	3.03	3.59	2.42	1.30
Female	4.27	3.35	1.82	3.00	3.30	3.43	2.96	3.01	3.57	2.67	1.32
Czech Republic	4.00	2.97	1.75	2.34	2.76	4.34	3.60	2.54	3.25	2.98	2.78
Male	3.87	3.02	1.76	2.09	2.69	4.27	3.59	2.63	3.22	2.87	2.77
Female	4.09	2.94	1.74	2.52	2.82	4.39	3.61	2.47	3.27	3.05	2.80
Switzerland	4.25	3.03	2.12	2.53	3.14	3.88	3.57	2.85	3.35	3.03	1.92
Male	4.26	3.04	2.14	2.48	3.20	3.85	3.60	2.99	3.37	3.02	1.93
Female	4.24	3.01	2.07	2.60	3.05	3.92	3.52	2.63	3.32	3.05	1.91
Portugal	4.03	3.51	2.30	2.83	3.14	3.38	3.55	2.85	3.52	3.08	2.07
Male	3.89	3.38	2.18	2.56	3.04	3.21	3.52	2.84	3.41	2.82	2.06
Female	4.11	3.58	2.36	2.99	3.20	3.47	3.57	2.86	3.58	3.22	2.08
Belgium	4.35	3.02	2.00	2.30	3.29	3.65	3.83	2.70	2.93	2.93	2.37
Male	4.29	3.06	1.91	2.20	3.30	3.63	3.79	2.11	2.76	2.96	2.27
Female	4.40	3.00	2.06	2.37	3.28	3.66	3.87	2.03	3.06	2.91	2.45
Estonia	4.64	2.87	2.08	2.72	3.37	3.35	3.67	2.17	3.48	2.92	2.32
Male	4.58	2.82	2.09	2.53	3.25	3.39	3.56	2.21	3.47	2.80	2.21
Female	4.66	2.89	2.07	2.81	3.42	3.36	3.71	2.16	3.49	2.97	2.36
TOTAL	3.90	3.08	2.07	2.61	3.05	3.67	3.49	2.70	3.35	3.00	2.27
Male	3.87	3.04	2.07	2.47	3.02	3.68	3.48	2.80	3.28	2.91	2.21
Female	3.93	3.10	2.07	2.72	3.07	3.66	3.50	2.61	3.40	3.05	2.29

Source: Own elaboration, REFLEX data.

4. Results

To clarify the effects of each explanatory variable on the evaluation of the study programme as a good basis for starting work, further learning on the job, performing current work tasks, future career, personal development and development of entrepreneurial skills, we estimate three different specifications of the ordered probit equation on the pooled European data set in order to assess the effects of study programme characteristics on graduates' assessment of the study programme across Europe. The estimation results are presented in Table 3. Dummy variables for each European country included in the sample were applied to all the models as control variables.

Female graduates assessed more positive the dimensions of the study program for personal development, further learning on the job and performing their current job tasks than their male counterparts. By contrast, the development of entrepreneurial skills is negatively evaluated by young female graduates. The result may be explained because the importance of education in terms of increasing self-perception, the desire for challenge, intellectual growth, personal enjoyment and self-determination, which is seen to be higher for women than for men (Brush, 1992; Buttner & Moore, 1997; Wilson et al., 2007; Yu, 2011; Ismail et al., 2012).

On the other hand, family educational background influences as it was expected: the higher the father's educational level, the lower graduates' assessment scores reached on their study program as a good basis for performing current job tasks. This support the empirical evidence that educational expectations that parents place on their children have been noted to be tied up with their own education: parents hope that their child will get an education at least to the level they accomplished, which is then also reflected in the children's own expectations (Räty et al., 2002). Additionally, the higher the mother's educational level, the lower graduates' assessment scores reached on their study program as a good basis for developing entrepreneurial skills (Tsyganova & Shirokova, 2010).

For field of study, those graduated in Medical Sciences and Engineering seems that their study program is not so good for starting work, for performing their current job tasks and for further learning on the job. Now, those graduates that were full-time students scored low the relevance of their study program as a basis for developing entrepreneurial skills, and those who hold additional learning experience from internships scored low their study program as a basis for performing their current job tasks, future career and personal development.

A well-designed degree program influences positive in all the six dimensions considered in the analysis. Regarding modes of teaching and learning, it seems that participation in research projects and the teacher as the main source of information did not provide a good basis for graduates' personal development (this result was also found in Kucel & Vilalta-Bufí, 2013). However, the teacher as the main source of information seems beneficial for future career and for further learning on the job. Those holding full-time jobs scored negative their study program

as a good basis for personal development and for performing current job tasks. The use of knowledge and skills at work raised graduates' usefulness of their study program, even more for those graduated in a university rather than another type of HE institutions. Regarding country-specific characteristics, noteworthy cross-national differences became apparent, suggesting country-specific patterns of HE segmentation, overall in the assessment of the study program as a good basis for developing entrepreneurial skills.

5. Conclusions

In this paper we approach the question of the education-related characteristics (study provision and modes of teaching and learning) as determinants of education satisfaction for young HE graduates in Europe. HE is an important investment for individuals and for society, therefore it is important to identify which aspects are assessed negatively for graduates in order to learn from the mistakes and improve outcomes for future generations. A number of studies focused on why HE graduates regret their field of studies; however, our research proposes two new relevant points of interest. First, it is based on a multi-country set of data, which allows booth a pan-European view at the topic and comparisons to be made between individual countries, so we can observe what is similar and what is not among them. The second aspect of our research that should be emphasized is the quality of the data regarding education. We are able to consider many education-related characteristics such as fields of study, graduates' opinion about their educational experience, modes of teaching and learning, and their perception of the match between knowledge and competencies acquired and those required by jobs. This comprehensive data set allows us to present a new perspective on the educational causes behind education satisfaction/rejection.

We have found some interesting differences between countries in the particular profile presented by the HE system. Whereas the educational systems in Finland, Norway, the Netherlands, Czech Republic and Portugal were strongly vocational in their orientation, in other countries – including Austria and Germany with their famous binary systems – few graduates described their HE as strongly vocational. Even in countries in which HE was strongly vocational in its orientation, few reported that employers were familiar with the content of the program. In general, HE in Europe appears to be rather broad in its focus, but graduates nonetheless report having had little freedom to compose their own program.

In terms of modes of teaching and learning, we have found some interesting results. Despite the attention that has been paid in recent years to more student-centered and active forms of learning, at the end of the last millennium HE in Europe remained rather traditional, with a strong emphasis on lectures, and on the role of teacher as main source of information, and only rather limited application of group learning and project- or problem-based learning. There was generally more emphasis on theories and paradigms than on facts and practical knowledge, although in France, the Netherlands and Estonia emphasis was slightly more on the latter than

on the former. Assessment relies in all countries more strongly on written assignments and oral presentations than on multiple choice exams. Students in most countries are given little opportunity to gain hands on experience as a formal component of the study program, and such experience as there is usually takes the form of work placements and internships rather than participation in research projects.

Regarding graduates' evaluation of their study program, in most countries graduates indicated that their study program formed a good basis for starting work, for performing their work tasks, for further learning on the job and future career development. However, the aspect on which graduates evaluated their program most negatively was as a basis for developing entrepreneurial skills and personal development. Hence, our results point towards the need that personal development achieved during HE and entrepreneurial skills should not be disregarded when designing study programs in any education system.

Table 3. Overall evaluation of the study programme. To what extent has your study programme been a good basis for?

The study programme good basis for: →	Starting work		Further learning on the job		Performing your current tasks		Future career		Personal development		Developing entrepreneurial skills	
	Coef.	z-values	Coef.	z-values	Coef.	z-values	Coef.	z-values	Coef.	z-values	Coef.	z-values
Individual characteristics												
Female	0.0223	1.25	0.0838	4.72	0.0785	4.43	0.0118	0.67	0.0873	4.89	-0.0393	-2.21
Age	-0.0136	-2.94	0.0016	0.34	0.0047	1.03	0.0081	1.77	0.0095	2.06	-0.0228	-4.95
Father's higher education	-0.0146	-0.78	0.0013	0.07	-0.0484	-2.61	-0.0184	-0.99	-0.0285	-1.52	-0.0382	-2.04
Mother's higher education	-0.0141	-0.68	0.0148	0.71	-0.0189	-0.91	-0.0209	-1.01	-0.0184	-0.88	-0.0516	-2.46
Field of study (ref. Social Science)												
Education	-0.2245	-6.60	-0.1699	-5.04	-0.2077	-6.16	-0.3450	-10.29	-0.1184	-3.49	-0.5900	-16.99
Humanities	-0.2047	-6.20	-0.1536	-4.67	0.0358	1.09	-0.2376	-7.25	0.2846	8.42	-0.4458	-13.25
Law	0.0598	1.55	0.0762	2.00	0.1954	5.11	0.2270	5.91	0.0001	0.00	-0.1603	-4.21
Natural Sciences	-0.0871	-2.37	-0.0115	-0.31	-0.0029	-0.08	-0.2844	-7.80	0.0747	2.02	-0.6495	-17.34
Mathematics	0.1301	3.02	0.0729	1.72	0.0497	1.18	-0.2074	-4.93	-0.2031	-4.80	-0.3660	-8.69
Engineering	0.0056	0.23	0.0502	2.09	-0.0512	-2.14	-0.1750	-7.31	-0.0900	-3.73	-0.3182	-13.27
Medical sciences	-0.1557	-4.93	-0.0029	-0.09	-0.0993	-3.19	-0.2237	-7.20	-0.0719	-2.30	-0.6894	-21.77
Other learning experiences												
Full-time student	0.1889	8.20	0.0424	1.84	0.0594	2.60	-0.0136	-0.59	-0.0136	-0.59	-0.0584	-2.52
Internship during study programme	0.0047	0.22	-0.0015	-0.07	-0.0425	-1.95	-0.0634	-2.92	-0.0616	-2.80	-0.0255	-1.16
Study-related working experience	0.0832	4.84	0.0785	4.59	0.0347	2.04	0.0419	2.47	0.0314	1.83	0.0728	4.23
Non-study-related working experience	-0.0017	-0.09	-0.0057	-0.32	-0.0567	-3.16	-0.0884	-4.93	-0.0090	-0.50	-0.0564	-3.13
Study programme description												
Regarded as demanding	0.0666	6.31	0.0716	6.82	0.0505	4.82	0.0808	7.73	0.0438	4.14	0.0493	4.64
Employers familiar with content	0.1242	15.72	0.0757	9.64	0.0742	9.49	0.0882	11.31	-0.0124	-1.56	0.0328	4.15
Freedom in composing the programme	0.0111	1.43	0.0295	3.80	0.0223	2.88	0.0135	1.76	0.0626	8.02	0.0446	5.74
Broad focus	0.0360	4.25	0.0464	5.51	0.0268	3.20	0.0350	4.19	0.0798	9.44	-0.0051	-0.60
Vocationally orientated	0.1671	19.37	0.1049	12.28	0.1293	15.19	0.1174	13.82	0.0876	10.20	0.0706	8.22
Academically prestigious	0.1037	11.83	0.0876	10.07	0.0776	8.96	0.1440	16.62	0.0952	10.87	0.0747	8.52
Modes of teaching and learning												
Lectures	0.0404	4.60	0.0469	5.37	0.0193	2.22	0.0260	3.00	0.0295	3.36	0.0070	0.80
Group assignments	0.0044	0.50	0.0191	2.17	-0.0020	-0.23	0.0103	1.18	0.0358	4.05	0.0721	8.11
Participation in research projects	-0.0222	-2.56	0.0168	1.94	0.0178	2.08	0.0002	0.02	0.0062	0.71	0.0623	7.22
Internship, work placement	0.0356	4.06	-0.0012	-0.14	0.0112	1.29	-0.0011	-0.13	0.0126	1.44	0.0024	0.28

Facts and practical knowledge	0.0687	7.70	0.0743	8.39	0.0681	7.71	0.0498	5.66	0.0620	6.95	0.0413	4.63
Theories and paradigms	-0.0101	-1.13	0.0553	6.24	0.0056	0.63	0.0242	2.74	0.0801	8.98	-0.0206	-2.31
Teacher main source of information	0.0181	2.05	0.0157	1.79	0.0095	1.08	0.0213	2.43	0.0116	1.32	0.0270	3.03
Project and/or problem-based learning	0.0403	4.67	0.0380	4.44	0.0428	5.02	0.0513	6.03	0.0498	5.77	0.0897	10.43
Written assignments	0.0196	2.33	-0.0013	-0.16	0.0257	3.09	0.0242	2.90	0.0377	4.49	-0.0122	-1.44
Oral presentation by students	0.0135	1.55	0.0143	1.64	0.0295	3.41	0.0163	1.89	0.0723	8.27	0.0555	6.35
Multiple choice exams	-0.0317	-4.09	-0.0177	-2.30	-0.0300	-3.91	-0.0042	-0.54	-0.0254	-3.28	0.0455	5.88
Job characteristics												
Hourly wage (log)	0.1338	5.54	0.0069	0.29	-0.0200	-0.84	0.0342	1.43	-0.0367	-1.52	0.0276	1.14
Private sector	-0.0897	-4.67	-0.0866	-4.53	-0.1608	-8.43	-0.0782	-4.12	-0.0511	-2.66	0.1649	8.59
Permanent contract	0.1197	5.65	-0.0081	-0.39	-0.0657	-3.12	-0.0186	-0.89	0.0029	0.14	0.0523	2.45
Full-time job	0.0141	0.58	0.0007	0.03	-0.0480	-1.98	0.0350	1.45	-0.0540	-2.21	0.0489	1.99
Size firm (<50 workers)	-0.0629	-3.29	-0.0235	-1.23	0.0359	1.89	-0.0393	-2.08	-0.0309	-1.62	0.0190	0.99
Appropriateness of qualifications												
Qualifications used at work	0.2050	10.88	0.2765	14.69	0.5117	27.16	0.2277	12.17	0.1681	8.88	0.0626	3.29
Under-educated	-0.0574	-2.43	0.0564	2.40	-0.0610	-2.61	0.0240	1.03	0.0463	1.96	-0.0411	-1.74
Over-educated	-0.2438	-9.08	-0.0972	-3.63	-0.2978	-11.13	-0.0315	-1.18	0.0397	1.46	0.0173	0.64
Deficit in competencies	-0.0143	-0.66	0.0187	0.88	-0.0679	-3.20	-0.0145	-0.69	-0.0073	-0.34	-0.0190	-0.88
Surplus in competencies	0.0920	4.95	0.0173	0.94	0.0982	5.34	0.0929	5.06	0.0745	4.02	0.0115	0.62
Job in own domain	0.4819	19.65	0.4285	17.45	0.7770	31.29	0.4846	19.79	-0.0149	-0.60	0.1171	4.70
Universities vs HEIs	0.0281	0.94	0.0885	3.03	0.0862	2.96	0.0888	3.05	-0.0315	-1.07	-0.1438	-4.92
Occupational titles *(ref. Professionals)*												
Legislators/senior official & managers	0.0023	0.08	-0.0432	-1.42	-0.0451	-1.49	0.0342	1.12	0.1551	5.03	0.2486	8.21
Technicians & associate professionals	0.0213	1.01	-0.0047	-0.23	0.0120	0.58	0.0133	0.64	0.0317	1.51	0.1467	7.02
Clerks	-0.1447	-3.49	-0.0455	-1.10	-0.0353	-0.85	0.0255	0.62	0.0301	0.72	0.0216	0.52
Service workers and other occupations	-0.2805	-5.38	-0.1901	-3.66	-0.2919	-5.53	-0.0108	-0.21	-0.0003	-0.01	0.0461	0.88
Country dummies *(ref. Germany)*												
Italy	0.0553	0.94	0.3020	5.19	0.0193	0.33	-0.2039	-3.52	-0.2017	-3.40	0.1756	2.95
Spain	0.2672	4.79	0.2901	5.25	0.0290	0.53	0.0990	1.79	-0.2268	-4.03	0.6338	11.24
France	0.2308	3.83	0.4626	7.75	0.1912	3.21	0.1563	2.63	-0.3152	-5.23	1.0208	16.93
Austria	0.3819	6.43	0.1782	3.05	0.2751	4.70	0.2438	4.16	-0.0243	-0.40	0.2332	3.91
The Netherlands	0.0364	0.69	0.3796	7.25	0.1578	3.02	0.1914	3.67	-0.2777	-5.20	-0.0917	-1.72
United Kingdom	-0.0941	-1.52	0.0113	0.18	-0.1309	-2.12	0.1116	1.81	-0.3654	-5.82	0.1241	1.98
Finland	-0.0759	-1.42	0.3198	5.98	0.0971	1.82	-0.1259	-2.37	-0.5518	-10.15	-0.1947	-3.55
Norway	0.6540	11.38	0.5139	9.22	0.4298	7.72	0.4361	7.84	-0.1469	-2.60	-0.1865	-3.27
Czech Republic	0.1831	3.30	0.2885	5.24	0.1462	2.65	0.0792	1.44	-0.2049	-3.64	-0.1902	-3.37

Switzerland	0.0659	1.39	0.2526	5.37	0.1921	4.08	0.1085	2.31	-0.3551	-7.36	0.4489	9.32
Portugal	0.2402	3.02	0.3477	4.42	0.3640	4.61	0.1129	1.44	-0.1459	-1.83	0.5407	6.93
Belgium	0.0039	0.06	0.5492	8.83	0.2837	4.59	0.1688	2.74	-0.1478	-2.35	0.2676	4.27
Estonia	0.2146	3.17	0.4367	6.44	0.2718	4.02	0.2461	3.64	-0.0974	-1.41	0.7650	11.21
Observations	*19,084*		*19,084*		*19,084*		*19,084*		*19,084*		*19,084*	
Lrχ^2(61)	*5,453*		*3,695*		*6,146*		*3,965*		*2,134*		*4,993*	
Prob> χ^2	*0.0000*		*0.0000*		*0.0000*		*0.0000*		*0.0000*		*0.0000*	
Log Likelihood	*-24,777*		*-24,301*		*-24,755*		*-25,139*		*-23,799*		*-25,599*	

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Appendix

Table 1A. Descriptive statistics

Variables	Mean	Std. Dev.	Min.	Max
Individual characteristics				
Female	0.57	0.49	0	1
Age	29.83	2.21	26	35
Father's higher education	0.37	0.48	0	1
Mother's higher education	0.25	0.43	0	1
Field of study (ref. Social Science)				
Education	0.09	0.29	0	1
Humanities	0.10	0.30	0	1
Law	0.06	0.25	0	1
Natural Sciences	0.06	0.24	0	1
Mathematics	0.04	0.19	0	1
Engineering	0.20	0.39	0	1
Medical sciences	0.14	0.38	0	1
Other learning experiences				
Full-time student	0.83	0.37	0	1
Internship during study programme	0.54	0.49	0	1
Study-related working experience	0.50	0.50	0	1
Non-study-related working experience	0.67	0.46	0	1
Study programme description				
Regarded as demanding	3.59	0.92	1	5
Employers familiar with content	3.10	1.15	1	5
Freedom in composing the programme	2.67	1.16	1	5
Broad focus	3.55	0.98	1	5
Vocationally orientated	3.06	1.20	1	5
Academically prestigious	3.05	1.14	1	5
Modes of teaching and learning				
Lectures	3.89	1.05	1	5
Group assignments	3.07	1.13	1	5
Participation in research projects	2.07	1.09	1	5
Internship, work placement	2.63	1.38	1	5
Facts and practical knowledge	3.05	1.11	1	5
Theories and paradigms	3.66	1.07	1	5
Teacher as the main source of information	3.50	0.96	1	5
Project and/or problem-based learning	2.71	1.12	1	5
Written assignments	3.34	1.09	1	5
Oral presentation by students	2.99	1.12	1	5
Multiple choice exams	2.28	1.21	1	5

Job characteristics				
Hourly wage (log)	2.47	0.48	-0.64	5.98
Private sector	0.57	0.49	0	1
Permanent contract	0.77	0.42	0	1
Full-time job	0.82	0.38	0	1
Size firm (<50 workers)	0.30	0.45	0	1
Appropriateness of qualifications				
Qualifications used at work	0.64	0.48	0	1
Under-educated	0.13	0.33	0	1
Over-educated	0.11	0.32	0	1
Deficit in competencies	0.22	0.41	0	1
Surplus in competencies	0.40	0.49	0	1
Job in own domain	0.76	0.42	0	1
Universities vs HEIs	0.83	0.37	0	1
Occupational titles (ref. Professionals)				
Legislators, senior official and managers	0.07	0.26	0	1
Technicians and associate professionals	0.18	0.38	0	1
Clerks	0.04	0.19	0	1
Service workers and other occupations	0.02	0.15	0	1
Country dummies (ref. Germany)				
Italy	0.08	0.27	0	1
Spain	0.11	0.32	0	1
France	0.05	0.21	0	1
Austria	0.04	0.20	0	1
The Netherlands	0.09	0.29	0	1
United Kingdom	0.04	0.19	0	1
Finland	0.07	0.25	0	1
Norway	0.05	0.22	0	1
Czech Republic	0.20	0.39	0	1
Switzerland	0.13	0.33	0	1
Portugal	0.02	0.13	0	1
Belgium	0.04	0.19	0	1
Estonia	0.03	0.16	0	1